A Level Computer Science

Exam Style Questions

Unit 1.4.2

Data Structures

Arrays

Name		Date	

Score	Percentage	Grade
/ 20		

Question 1

Laser Tag is a game where teams of players move round an arena shooting each other with infrared guns. Players wear sensors that keep track of how many times they have been hit by the laser. This is known as being 'tagged'.

At the end of each match players upload their score to a computer. The computer stores the scores in the order they are received in a 2D array called `player`. The array stores the team as an integer (1 for green, 2 for red) and their score. An extract of the array called `player` is shown below. The first entry shows a green team member scored 45 points and the next shows a red team member scored 30 points.

1	45
2	30
2	46
1	31
1	10
1	32
2	2

Once all the players have uploaded their scores the computer adds up the scores for each team.

Using pseudocode write a program for a procedural language that works out and outputs the total score for each team. You may assume that there are always 20 players.

[6]

Question 2

A DIY store has an offer: 'Spend £20 or more on decorating products and get 10% off all gardening products.'

When items are scanned in at the checkout they are stored in a 2-dimensional array called purchases, which stores the item name, category and price.

A receipt with the appropriate discounts deducted is then produced.

Examples of the array and corresponding receipt are shown below.

Matt Pink Paint	Decorating	6.99
Floral Wallpaper	Decorating	7.99
Magnolia Gloss Paint	Decorating	5.49
Weed Killer	Gardening	2.99
Picture Frame	Decorating	8.99
Plug Socket	Electrics	6.99
Doorbell	Electrics	15.99
Matt White Paint	Decorating	4.99
Tiles	Decorating	19.99
Grass Seed	Gardening	1.99
Lawn Mower	Gardening	129.99

```
Matt Pink Paint £6.99
Floral Wallpaper £7.99
Magnolia Gloss Paint £5.49
Weed Killer £2.99
-£0.30 discount
Picture Frame £8.99
Plug Socket £6.99
Doorbell £15.99
Matt White Paint £4.99
Tiles £19.99
Grass Seed £1.99
-£0.20 discount
Lawn Mower £129.99
-£13.00 discount
------------------------
TOTAL: £198.89
```

Write an algorithm in pseudocode, using the array purchases, to:

- determine which items are given a discount
- calculate the total price to pay
- present this information on a receipt in the format shown above (right).

[6]

Question 3

A meteorologist sets up a weather station to monitor temperatures throughout the year. She classifies temperatures in one of four bands:

BAND	TEMPERATURE RANGE (degrees Celsius)
Band A	10 or below
Band B	11 - 20
Band C	21 - 30
Band D	31 or above

The weather station records the temperature every day as an integer. At the end of the year the temperatures are stored in an array called temperatures.

Write a program in pseudocode that reads through this array and produces an output which shows the total number of days within each band. An example of such an output is shown below.

Band A: 93
Band B: 143
Band C: 98
Band D: 31

Ensure your code is efficient.

[6]

Question 4

A programmer has written the following code designed to take in ten names then print them in a numbered list.

```
name1 = input("Enter a name: ")
name2 = input("Enter a name: ")
name3 = input("Enter a name: ")
name4 = input("Enter a name: ")
name5 = input("Enter a name: ")
name6 = input("Enter a name: ")
name7 = input("Enter a name: ")
name8 = input("Enter a name: ")
name9 = input("Enter a name: ")
name10 = input("Enter a name: ")

print("1. " + name1)
print("2. " + name2)
print("3. " + name3)
print("4. " + name4)
print("5. " + name5)
print("6. " + name6)
print("7. " + name7)
print("8. " + name8)
print("9. " + name9)
print("10. " + name10)
```

It has been suggested that this code could be made more efficient and easier to maintain using an array or a list.

Define the term 'array'.

[2]